AFRL-SA-WP-TR-2011-0004

NEO PI-R NORMATIVE PERSONALITY DATA THAT DISTINGUISH U.S. AIR FORCE MQ-1 PREDATOR AND MQ-9 REAPER SENSOR OPERATORS FROM AC-130 GUNSHIP SENSOR OPERATORS AND PEERS IN THE GENERAL POPULATION

Robert Craig-Gray, Lt Col, USAF, MC
Wayne L. Chappelle, Psy.D., ABPP

John Heaton, M.A.
Medpro, Wright-Patterson AFB, OH
Amber Salinas, M.A.
Eagle Applied Sciences, San Antonio, TX

June 2011

Final Report for
July 2010 to June 2011

Air Force Research Laboratory
711th Human Performance Wing
School of Aerospace Medicine
Aerospace Medicine Education
2510 Fifth St.
Wright-Patterson AFB, OH 45433-7913

NOTICE AND SIGNATURE PAGE

AFRL-SA-WP-TR-2011-0004 HAS BEEN REVIEWED AND IS APPROVED FOR PUBLICATION IN ACCORDANCE WITH ASSIGNED DISTRIBUTION STATEMENT.

//SIGNATURE//	//SIGNATURE//
DAVID B. RHODES, COL, USAF, MC	ROBERT E. CARROLL, COL, USAF, MC

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From – To)*
30-06-2011	Final Technical Report	Jul 2010 – Jun 2011

4. TITLE AND SUBTITLE

NEO PI-R Normative Personality Data that Distinguish U.S. Air Force MQ-1 Predator and MQ-9 Reaper Sensor Operators from AC-130 Gunship Sensor Operators and Peers in the General Population

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

Robert Craig-Gray, Wayne L. Chappelle, John Heaton, Amber Salinas

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

USAF School of Aerospace Medicine
Aerospace Medicine Education
2510 Fifth St.
Wright-Patterson AFB, OH 45433-7913

8. PERFORMING ORGANIZATION REPORT NUMBER

AFRL-SA-WP-TR-2011-0004

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSORING/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT

Distribution Statement A: Approved for public release; distribution is unlimited. Case Number: 88ABW-2011-4519, 19 Aug 2011

13. SUPPLEMENTARY NOTES

14. ABSTRACT

The U.S. Air Force remotely piloted aircraft MQ-1 Predator and MQ-9 Reaper sensor operators (SOs) represent a group of enlisted airmen in a high-demand, high-precision, aviation-related position where they have a pivotal role in precision-strike aerial operations. This study evaluated psychological baseline test scores from the NEO Personality Inventory-Revised (NEO PI-R) on enlisted airmen who became operational Predator/Reaper SOs in an effort to assess how key personality traits (e.g., neuroticism, extraversion, openness, agreeableness, conscientiousness) distinguished them from peers in the civilian, general population as well as AC-130 gunship SOs. This study also developed occupationally specific normative data and distribution of personality scores for use in aeromedical evaluations of Predator/Reaper SO training applicants and incumbents. The results of the study shed light on objective personality traits and differences and assist military psychologists and flight surgeons with the interpretation of NEO PI-R test scores when evaluating the suitability and fitness for duty of training applicants and incumbents for such a unique and demanding career field. A case study and clinical vignette are provided to illustrate the practical application of study findings.

15. SUBJECT TERMS

Remotely piloted aircraft, sensor operators, psychological assessment, personality traits

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Wayne L. Chappelle
U	U	U	SAR	30	19b. TELEPHONE NUMBER *(include area code)*

This page intentionally left blank.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 EXECUTIVE SUMMARY

The U.S. Air Force (USAF) remotely piloted aircraft MQ-1 Predator and MQ-9 Reaper sensor operators (SOs) represent a group of enlisted airmen in a high-demand, high-precision, aviation-related position where they have a pivotal role in precision-strike aerial operations. This study evaluated psychological baseline test scores from the NEO Personality Inventory-Revised (NEO PI-R) on enlisted airmen who became operational Predator/Reaper SOs in an effort to assess how key personality traits (e.g., neuroticism, extraversion, openness, agreeableness, conscientiousness) distinguished them from peers in the civilian, general population as well as AC-130 gunship SOs. This study also developed occupationally specific normative data and distribution of personality scores for use in aeromedical evaluations of Predator/Reaper SO training applicants and incumbents. The results of the study shed light on objective personality traits and differences and assist military psychologists and flight surgeons with the interpretation of NEO PI-R test scores when evaluating the suitability and fitness for duty of training applicants and incumbents for such a unique and demanding career field. A case study and clinical vignette are provided to illustrate the practical application of study findings.

The findings and views expressed in this study are those of the authors and do not necessarily reflect the official position of the USAF or Department of Defense leadership. This study was conducted, in part, via research funds from the Defense Health Program.

2.0 INTRODUCTION

U.S. Air Force (USAF) MQ-1 Predator and MQ-9 Reaper sensor operators (SOs) have a critical role in remotely piloted aircraft (RPA) missions supporting intelligence, surveillance, reconnaissance (ISR) and precision-strike weapons operations. Their skills as image analysts are key to identifying and targeting enemy combatants and assets and areas of high military interest. The growing demand for Predator/Reaper aircraft and the increasing gap in available manpower to support such operations have increased the need to identify those airmen with the "right stuff" who can successfully pass training and adapt to the operational rigors of such a high-demand, high-precision duty position. Subject matter experts (SMEs) report this position requires enlisted airmen to possess a unique set of traits and characteristics (Ref 1). Specifically, high levels of self-discipline, self-confidence, emotional stamina, resilience, decisiveness, composure, perseverance, and motivation have been reported by SMEs to be critical to training and adapting to the operational demands. The identification of key attributes (e.g., personality traits) that distinguish enlisted airmen for Predator/Reaper SO duties is crucial to aeromedical and recruitment agencies responsible for the sustainment and performance of those selected for such critical ISR and weapon-deploying operations.

General cognitive ability and aptitude have been established as having a substantial influence on the training and job performance for civilians (Ref 2,3) as well as enlisted USAF personnel Ref 4-7). However, the influence of personality traits is also reported to have an impact on job performance, retention, and satisfaction (Ref 8-12). In particular, personality traits may add to the incremental validity of personnel selection practices (Ref 2,13) and are considered critical to the selection of U.S. military personnel in high-demand, high-risk duty positions (Ref 14). However, at the present time, there are no published studies regarding objective personality testing of Predator/Reaper SOs. As a result, the knowledge and research on

normative personality traits of those who occupy such a highly specialized aviation-related career field are limited.

To fill the gap in the literature, this study evaluated psychological baseline test scores from the NEO Personality Inventory-Revised (NEO PI-R) on enlisted airmen who successfully passed MQ-1 Predator/MQ-9 training in an effort to (a) obtain normative personality testing on Predator/Reaper SO incumbents to assess how the personality traits of such a specialized group of enlisted airmen differ from the civilian, non-aircrew general population; (b) assess how key personality traits (e.g., neuroticism, extraversion, openness, agreeableness, conscientiousness) for incumbents differ from enlisted airmen who pursue ISR weapon-deploying SO duties in a manned airframe, the AC-130 gunship; and (c) develop occupationally specific normative data and distribution of personality scores for use in aeromedical evaluations. A case vignette is provided to illustrate application of study findings. The results of the study aim to shed light on objective personality traits and differences and assist military psychologists with the interpretation of NEO PI-R psychological test scores when evaluating the suitability and fitness of training applicants and incumbents.

2.1 Role and Aircrew of the MQ-1 Predator/MQ-9 Reaper

Although the Department of Defense (DoD) has a large inventory of remotely piloted aircraft, the MQ-Predator and MQ-9 Reaper have emerged as dominant ISR weapon-bearing aircraft. Such aircraft have become critical assets to combatant commanders. Overseeing U.S. military Operation Iraqi Freedom and Operation Enduring Freedom, such aircraft have a pivotal role in providing force protection, armed reconnaissance, close air support of ground troops, and precision "aerial sniper" strikes. They allow for identification and tracking of enemy combatants and assets, streaming of live "real time" video to increase visibility of areas of interest for joint forces, as well as survey post-strike battle damage to ensure effective mobilization of targets. Such aircraft have given ground forces and combatant commanders a new and diverse set of real time options that have greatly increased their ability to interdict enemy movement and assets. As a result, the MQ-1 Predator and MQ-9 Reaper have emerged as invaluable "go to" ISR weapons systems (Ref 15). Because of the unique capabilities such airframes provide and their roles in supporting joint special operations, such aircraft have been deemed invaluable, and the USAF is committed to fully developing and maximizing the role of such aircraft to include identification and selection of commissioned officers and enlisted personnel with the "right stuff" for being Predator/Reaper crew members.

The MQ-1 Predator/MQ-9 Reaper has a crew of three military personnel composed of a commissioned officer (i.e., a pilot) and two enlisted personnel (i.e., the sensor operator and mission intelligence coordinator). Although each crew member is instrumental in successful mission performance, there is growing attention on the SO's role because of the requirements of this position for identifying and targeting enemy combatants and resources through highly sophisticated and complex imagery analysis and electronic weaponry. The SO works with the integration of cutting-edge developments in computer-based, aviation, and satellite technology. Without such a crew position, the reconnaissance and force protection capability of the Predator/Reaper aircraft is significantly limited.

2.2 Duties and Role of the Predator/Reaper Sensor Operator

The following brief review of the Predator/Reaper SO duties and role is an excerpt adapted from Chappelle, McDonald, and King (Ref 1) and reproduced with the authors' permission.

In general, Predator/Reaper SOs employ airborne sensors in manual or computer-assisted modes to actively and/or passively acquire, track, and monitor still and moving airborne, maritime, and ground objects; enemy combatants; and assets. They conduct operations and procedures in accordance with special instructions, air tasking orders (ATO), and rules of engagement. They assist RPA pilots through all phases of employment to include mission planning, flight operations, and debriefings. Specific duties include (a) conducting reconnaissance and surveillance of potential targets and areas of interest; (b) detecting, analyzing, and discriminating between valid and invalid targets using synthetic aperture radar, electrooptical, low-light, and infrared full-motion video imagery, and other active or passive tracking systems; (c) assisting in air navigation, air order of battle (AOB) integration, fire control planning, and determining effective weapons control and delivery tactics to achieve overall mission objectives; (d) receiving target briefs (9-liners) for weapons delivery and conducting immediate first phase battle damage assessments for up-channel coordination and potential re-attack; (e) utilizing laser target marking systems to provide target identification and illumination for onboard weapons delivery and being responsible for terminal weapons guidance; (f) performing preflight and in-flight mission planning activities in accordance with unified combatant command and theater rules of engagement; (g) understanding tactics, techniques, and procedures for friendly and enemy AOB assets; (h) operating mission planning ancillary equipment to initialize information for download to airborne mission systems; (i) receiving, interpreting, extracting, and disseminating relevant ATO, airspace control order, and SPINs information; (j) participating in post-flight debriefing to establish mission accomplishments and potential procedural development; (k) researching and studying target imagery, friendly and enemy orders of battle, and offensive and defensive capabilities from various sources; and, lastly, (l) assembling target information, locating forces, and determining hostile intentions and possible tactics.

As can be surmised from above, this enlisted position requires a person to visually discriminate and synthesize various forms of visual and auditory information necessary for sustaining situational awareness. For example, the SO must effectively attend to the electronic video to calibrate instruments and distances of specific ground objects while maintaining vigilance to visual and auditory input from ground forces, aircrew, and command. The SO must also effectively communicate with various groups of military personnel to report the identification and discrimination of targets and to assist in the deployment of weapons. The SO must also sustain visual targeting during and following the employment of weapons to ensure accuracy and damage assessment. This includes visually observing the destruction of fixed and moving objects (such as buildings and cars), as well as the wounding and death of human combatants.

As mentioned above, SOs must carry out their duties in a confined environment with specific rules of engagement, tactics, and techniques. As a result, command and medical leadership (Ref 1) concludes that such a high-demand, high- precision duty position of a Predator/Reaper SO is best suited for military personnel with a unique set of psychological attributes (e.g., cognitive aptitudes, personality traits, and motivation). For a more in-depth review of Predator/Reaper SO duties, please see Nagy, Muse, and Eaton (Nagy J, Muse K, Eaton

G, *U.S. Air Force Unmanned Aircraft Systems Performance Analyses: Predator Sensor Operator Front End Analysis (FEA) Report*, SURVIAC-TR-10-043, 18 Aug 2006; available through the Defense Technical Information Center to U.S. Government agencies and their contractors only).

Although the risk to personal safety has been removed due to the unmanned nature of RPA operations, the monotonous nature of the work that is interrupted by unpredictable and intense moments of combat can be both mentally and physically fatiguing. Despite the potential for fatigue, the SO must quickly and efficiently monitor and respond to multiple visual and auditory sources of communication with the pilot, mission intelligence coordinator, ground forces, and other aircrew (manned and unmanned). The duties of an SO are clearly high demand because of the unique skill set related to surveillance and precision-strike operations, and mistakes can come at a significant risk to the lives of others, military operations, national security, and foreign relations. Understanding basic principles of aviation, crew resource management, communication protocols, geo-spatial mapping, imagery and full motion video analysis, as well as principles of reconnaissance, targeting, and weapons deployment are key components to SO tasks. However, SOs are also faced with the highly unique challenge of providing continual support to combat operations in theaters of conflict while living and working in a peaceful environment and managing domestic roles (i.e., spouse and parent) and responsibilities. Effectively adapting to the Predator/Reaper platform requires SOs to effectively balance and integrate their role as a war fighter with their personal lives.

2.3 Reasons for Modern Normative Data for MQ-1 Predator SOs

The selection of enlisted personnel for Predator/Reaper SO begins with medical flight screening to ensure there are no disqualifying aspects regarding a training applicant's psychological disposition. According to USAF aeromedical policy and Air Force instruction (AFI), Predator/Reaper SO training applicants must meet aeromedical ground-based controller standards (Ref 16). As a result, an aeromedical evaluation of a Predator/Reaper SO training applicant's (or incumbent's) psychological disposition is often required when there is a history of a developmental disorder (e.g., attention deficit and hyperactivity, learning disorder), emotional problem (e.g., depression, anxiety), or suspicion of maladaptive personality traits. In general, personality testing is a common part of an aeromedical evaluation when there is concern regarding a training applicant's (or incumbent's) psychological disposition affecting his or her ability and reliability to participate in such high-demand, high-precision aviation-related duties.

Furthermore, all Predator/Reaper SO training applicants and incumbents must be evaluated by a flight medicine physician and given an aeromedical adaptability rating). The rating is a dichotomous response of satisfactory or unsatisfactory. According to USAF aeromedical policy (Ref 16), if a flight medicine physician perceives a training applicant has a given set of personality traits or characteristics that is incompatible with the demands of the crew position, then he or she can be disqualified from his or her position. However, without having any empirical studies regarding personality testing of enlisted airmen who passed versus failed Predator/Reaper SO training, it is difficult to accurately assess whether or not certain traits are incompatible for the high-demand, high-precision Predator/Reaper environment.

However, it is unclear if normative data based upon the civilian, non-aircrew general population are adequate for evaluating Predator/Reaper SOs. For example, what may be considered abnormal (or cause of concern) in the general population may be a common and adaptive trait of enlisted airmen who succeed as Predator/Reaper SOs and vice-versa. Incorrect

interpretations of SO training applicant (or incumbent) test scores may occur if normative data based upon civilian, general population are different than those who succeed as Predator/Reaper SOs.

2.4 Predator/Reaper SOs vs. AC-130 Gunship SOs

It is also unknown if there are striking differences between Predator/Reaper and AC-130 gunship SOs. Based upon the authors' experiences of consulting with line operators and flight medicine physicians from several Air Force installations, many perceive SOs assigned to different airframes (i.e., MQ-1 Predator vs. AC-130 gunship) have a different set of personality traits. For instance, it has been reported that AC-130 gunship SOs appear to be more aggressive, competitive, extroverted, and excitement seeking, perhaps, in part, to the requirements of flying in a combat zone at great risk to personal safety. In contrast, others have reported Predator/Reaper SOs to be more interpersonally warm, gregarious, and trusting, as well as more imaginative. It is difficult to identify the roots of these perceptions, which appear to be the result of stereotypes portrayed in the media regarding personnel who gravitate toward computer-centered careers. The flight medicine physicians and line operations that do report such differences tend to base their judgments on subjective impressions. Many do not share the same perceptions or report distinct differences across airframes. This discrepancy in perception has been the subject of discussion and debate between flight medicine physicians and line operators throughout the Air Force. However, there are no published studies assessing personality differences between MQ-1 Predator and AC-130 gunship SOs to clarify this issue. Personality traits that distinguish the two groups would be helpful for line and aeromedical leadership to understand the idiosyncrasies and culture of each group, as well as further improve the interpretation of psychological test scores of training applicants and incumbents seeking to enter into the Predator/Reaper career field.

2.5 Purpose of Study

As mentioned previously, to fill the gap in the literature, this study evaluated psychological baseline test scores from the NEO PI-R on enlisted airmen who successfully passed MQ-1 Predator SO training in an effort to (a) assess how the personality traits of such a specialized group of enlisted airmen differ from the civilian, non-aircrew general population; (b) assess for whether there are key personality traits (e.g., neuroticism, extraversion, openness, agreeableness, conscientiousness) for Predator SOs that distinguish them from SOs with similar duties that support manned airframes (i.e., AC-130); and (c) develop occupationally specific normative data and distribution of personality scores for use in aeromedical evaluations.

3.0 METHODS

3.1 Participants

3.1.1 Predator/Reaper Sensor Operators. A total of 56 active duty MQ-1 Predator and MQ-9 Reaper SOs who passed training volunteered to participate in cognitive testing for this study. This group consisted of 50 (89%) male and 6 (11%) female participants with an average of 29.09 (standard deviation (SD) = 7.34) years of age. There were 18 (35%) between the ranks of

Airman and Senior Airman (E1-E4), 17 (33%) between the ranks of Staff Sergeant and Technical Sergeant (E5-E6), and 7 (14%) between the ranks of Master Sergeant and Chief Master Sergeant (E7-E9); 14 (25%) did not report their rank.

3.1.2 AC-130 Gunship Sensor Operators. A total of 59 active duty AC-130 gunship SOs volunteered to participate in this study. This group consisted of 55 (93.2%) male and 4 (6.8%) female participants with an average of 31.54 (SD=7.14) years of age. One (1.7%) held the rank of Airman Basic, 4 (6.8%) were Airmen First Class, 5 (8.5%) were Senior Airmen, 20 (33.9%) were Staff Sergeants, 13 (22.0%) were Technical Sergeants, 13 (22.0%) were Master Sergeants (MSgt), and 3 (5.1%) were Senior Master Sergeants.

The voluntary and informed consent of enlisted airmen who participated was obtained. The purpose and methodology of the study were reviewed and approved by the Wright-Patterson Air Force Base Institutional Review Board and assigned protocol numbers F-WR-2009-0027-E and F-WR-2009-0047-E.

3.2 Measures

The NEO PI-R measures five major personality domains and the facets or traits that underlie each domain. The five domains are (a) Neuroticism – general tendency to experience negative emotions (e.g., anxiety, anger, depression) and overall susceptibility to psychological distress; (b) Extraversion – general level of interest in social groups/events and general expressions of warmth, gregariousness, assertiveness, and optimism, as well as interest in excitement and group activities; (c) Openness – flexibility with thinking and behaving differently, attentiveness to inner feelings, willingness to entertain novel ideas and unconventional values; (d) Agreeableness – general interpersonal tendencies regarding altruism, trust, straightforwardness, interest in avoiding conflict, competitiveness, and tendermindedness; and (e) Conscientiousness – general level of interest in planning, organizing, carrying out tasks, self-discipline, and achievement. Each of these domains is composed of six additional facet scores. These domains and facets found in the NEO PI-R serve to provide a comprehensive measurement of adult personality, with the goal of being a multipurpose personality inventory useful for predicting many criteria (Ref 17).

The NEO PI-R inventory contains a total of 240 statements that require subjects to respond on a Likert-type scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). The reliability coefficients for the 30 facets are reported in the test manual and range from .56 to .81. The normative sample, Form S for adults, served as the general population norms for this study. For our SO study, the paper and pencil version of the NEO-PI-R was used. This version is self-paced, uses a standardized set of instructions, and is scored automatically.

3.3 Procedure

USAF operational leadership within line Air Combat Command and Air Force Special Operations Command units was contacted regarding the purpose of the study and the need for objective personality testing from personnel within the RPA MQ-1 Predator/MQ-9 Reaper and AC-130 gunship SO career fields to improve the aeromedical evaluation process of such airmen. Military leadership encouraged all available SOs to participate in the testing. A list of volunteers for testing was solicited by leadership through e-mail, phone, and in-person requests.

Participants were informed of the purpose of the study and that nonparticipation would not have a negative effect on their occupational prospects. They were informed individual test results were confidential and would not be included in their military medical or personnel records. They were also instructed that military leadership would not have access to individual scores and their test results would remain locked within the Department of Neuropsychiatry at the USAF School of Aerospace Medicine. They were instructed on the purpose of the research, which was to develop occupationally specific normative data for personality testing and to improve the aeromedical evaluation process for sensor operators supporting remotely piloted and manned aircraft operations. They were instructed on how they could obtain access to their test scores, if desired, at a later date. Volunteers were assigned to small groups of 5 to 10 participants and tested in a classroom within the squadron facility. Participants were given the paper and pencil Form S version of the NEO PI-R, as previously noted, which was self-paced and scored automatically.

4.0 RESULTS

Table 1 provides the percentile equivalent scores according to the distribution of t-scores (based on the combined male-female civilian population normative data) for the domains and facet subscales for the NEO PI-R. Analyses of the data indicate a normal distribution for each of the variables. The table shows the distribution of t-scores according to specific percentiles. For example, in the seventh, although a t-score of 50 for the *Vulnerability* facet subscale is in the 50^{th} percentile and within normal limits for the civilian population, according to Table 1, such a score corresponds with the 90^{th} percentile and well above normal limits based upon the distribution of t-scores for the sample of Predator/Reaper SOs. The distribution table allows a psychologist to accurately interpret t-scores based upon the civilian normative sample in relation to the distribution of Predator/Reaper SOs.

Table 2 shows the means and standard deviations for enlisted airmen (incumbents) who successfully passed training, those who failed training, and the civilian combined male/female adult normative sample for the NEO PI-R (Ref 17). Table 2 also shows t-scores, p-values, and effect sizes for between-group comparisons for each domain and each facet. Two-tailed t-tests were conducted comparing the means of incumbent SOs to those who failed and for the civilian normative sample for each domain and facet score. For purposes of this study, we considered differences that met the following criteria to be operationally significant: (a) the a priori Type I error rate was set at $p < .05$ and (b) the effect size was equal to or greater than $d = .50$ (Ref 18).

Table 1. Distribution of RPA SO t-Scores According to Specific Percentiles

Domain/Facet	5%	10%	25%	50%	75%	90%	95%
Neuroticism	23	26	31	38	45	53	56
Anxiety	23	31	35	40	47	51	59
Anger	28	30	36	41	49	58	66
Depression	28	32	35	41	45	53	56
Self-Consciousness	26	32	36	44	49	53	58
Impulsivity	21	26	35	42	49	54	56
Vulnerability	23	25	32	39	44	50	55
Extraversion	19	25	36	45	53	65	67
Warmth	22	29	39	47	52	63	68
Gregariousness	20	26	36	46	54	59	65
Assertiveness	32	36	41	51	62	68	68
Activity	27	27	37	45	52	61	64
Excitement-Seeking	29	34	40	49	54	59	64
Positive Emotion	27	31	39	45	51	54	55
Openness	27	33	37	47	54	56	60
Fantasy	24	24	36	43	51	56	60
Aesthetics	21	30	33	40	48	54	54
Feelings	31	33	39	48	53	62	68
Actions	32	36	48	56	62	64	64
Ideas	23	29	38	49	57	57	72
Values	23	33	42	51	59	65	66
Agreeableness	30	35	43	51	58	62	67
Trusting	35	41	47	51	60	64	66
Straightforwardness	19	30	40	48	55	63	66
Altruism	35	37	44	49	59	65	65
Actions	30	32	42	50	57	61	63
Ideas	20	29	35	48	54	60	63
Values	35	39	46	52	57	64	64
Conscientiousness	40	42	46	52	60	65	65
Competence	31	39	43	48	55	58	64
Orderliness	40	45	50	53	59	64	69
Dutifulness	32	34	44	50	56	64	67
Achievement-Striving	35	42	46	52	58	62	64
Self-Discipline	31	38	46	52	59	64	66
Deliberation	23	26	31	38	45	53	56

Table 2. Descriptive Statistics and Comparisons of MQ-1 Predator and AC-130 Gunship SOs and the General Population

Domain Facet	MQ-1 Predator SOs (n=56)		AC-130 Gunship SOs (n=59)		MQ-1 Predator SOs vs. AC-130 Gunship SOs			Gen Pop[a] (n=1000)		MQ-1 Predator SOs vs. General Population Norms		
	Mean	SD	Mean	SD	t-score	p-value	Effect	Mean	SD	t-score	p-value	Effect
Neuroticism	71.4	21.1	67.4	21.4	1.00	0.32		79.1	21.2	-2.67	0.01	*-0.37*
Anxiety	12.7	4.5	11.0	4.2	2.10	0.04	*0.39*	14.3	5.3	-2.52	0.01	*-0.32*
Angry Hostility	12.6	5.1	12.8	4.8	-0.18	0.85		12.4	4.6	0.27	0.79	
Depression	10.3	4.8	9.4	4.3	1.05	0.30		12.3	5.4	-2.97	0.00	*-0.39*
Self-Consciousness	13.2	4.4	12.4	4.1	0.93	0.36		14.3	4.4	-1.84	0.07	*-0.25*
Impulsiveness	14.7	4.5	14.0	4.7	0.88	0.38		15.8	4.4	-1.79	0.07	*-0.25*
Vulnerability	7.8	4.0	7.8	3.9	0.04	0.97		10.0	3.9	-3.96	0.00	*-0.55*
Extraversion	111.8	24.4	115.6	17.2	-0.97	0.33		109.4	18.4	0.71	0.48	
Warmth	21.4	4.9	22.2	3.5	-0.98	0.33		22.9	4.0	-2.30	0.02	*-0.34*
Gregariousness	16.3	6.7	18.5	4.7	-1.98	0.05	*-0.37*	16.5	4.8	-0.20	0.84	
Assertiveness	17.3	5.8	18.2	4.6	-0.90	0.37		15.8	4.7	1.93	0.05	*0.29*
Activity	16.8	4.2	18.1	3.8	-1.82	0.07	*-0.34*	17.6	4.4	-1.44	0.15	
Excitement-Seeking	20.3	4.1	21.2	3.9	-1.20	0.23		16.4	4.9	6.79	0.00	*0.86*
Positive Emotion	19.7	5.2	18.1	3.9	1.83	0.07	*0.34*	20.2	4.5	-0.73	0.47	
Openness	106.3	16.6	101.6	13.8	1.63	0.11		110.6	17.3	-1.90	0.06	*-0.26*
Fantasy	18.1	4.9	15.4	4.9	2.90	0.00	*0.54*	16.6	4.9	2.23	0.03	*0.31*
Aesthetics	14.5	6.1	13.5	4.7	1.01	0.32		17.6	5.3	-3.78	0.00	*-0.55*
Feelings	18.1	4.2	18.6	3.5	-0.70	0.48		20.3	4.0	-3.75	0.00	*-0.53*
Actions	15.1	4.0	15.8	2.9	-1.01	0.31		16.4	3.7	-2.31	0.02	*-0.33*
Ideas	20.6	5.3	18.6	4.8	2.11	0.04	*0.39*	19.0	5.0	2.18	0.03	*0.31*
Values	19.8	4.4	19.7	3.3	0.19	0.85		20.7	4.1	-1.46	0.14	
Agreeableness	111.7	20.6	114.0	16.4	-0.65	0.52		124.3	15.8	-4.50	0.00	*-0.69*
Trust	18.7	5.0	19.1	5.3	-0.44	0.66		21.3	4.2	-3.85	0.00	*-0.57*
Straightforwardness	19.3	4.4	19.8	3.7	-0.60	0.55		21.2	4.4	-3.12	0.00	*-0.43*
Altruism	22.2	4.7	22.5	3.9	-0.37	0.71		23.6	3.5	-2.18	0.03	*-0.34*
Compliance	16.0	4.4	15.9	3.3	0.11	0.91		18.9	4.0	-4.93	0.00	*-0.70*
Modesty	17.4	4.9	18.0	3.8	-0.78	0.44		18.9	4.2	-2.28	0.02	*-0.33*
Tendermindedness	18.1	4.2	18.7	3.5	-0.75	0.46		20.5	3.5	-4.10	0.00	*-0.61*
Conscientiousness	118.1	18.1	123.6	20.7	-1.52	0.13		123.1	17.6	-2.02	0.04	*-0.28*
Competence	22.2	3.5	22.8	3.8	-0.85	0.40		22.2	3.5	-0.04	0.97	
Order	17.7	4.1	18.4	4.3	-0.83	0.41		19.0	4.2	-2.29	0.02	*-0.31*
Dutifulness	22.8	3.3	22.7	3.5	0.03	0.97		23.2	3.9	-0.98	0.33	
Achievement-Striving	18.5	4.9	20.4	4.4	-2.27	0.03	*-0.42*	19.5	4.0	-1.57	0.12	
Self-Discipline	19.9	4.3	21.8	4.6	-2.28	0.02	*-0.43*	21.8	4.3	-3.30	0.00	*-0.45*
Deliberation	17.1	4.7	17.6	4.2	-0.52	0.61		17.5	4.1	-0.57	0.57	

[a]Adapted and reproduced by special permission of the publisher Psychological Assessment Resources, Inc. (PAR), 16204 No. Florida Ave, Lutz, FL 33549, from the NEO Personality Inventory-Revised Manual by Paul T. Costa, Jr., Ph.D., and Robert McCrae, Ph.D., Copyright 1985, 1992 by PAR. Further reproduction is prohibited without permission of PAR.

Figures 1-6 are box plot scores for the NEO PI-R domain scales and corresponding facet subscales. The scores show similarity of Predator/Reaper and AC-130 SOs between-group comparison of the mean, median, range, and general distribution of scores for each domain and facet. Each box plot depicts the range and average scores. The diamond shape is the mean. The horizontal line within each box is the median. The area within each box represents 1 SD above and below the mean. The average standard NEO PI-R scores in the general population have a mean of 50 and an SD of 10.

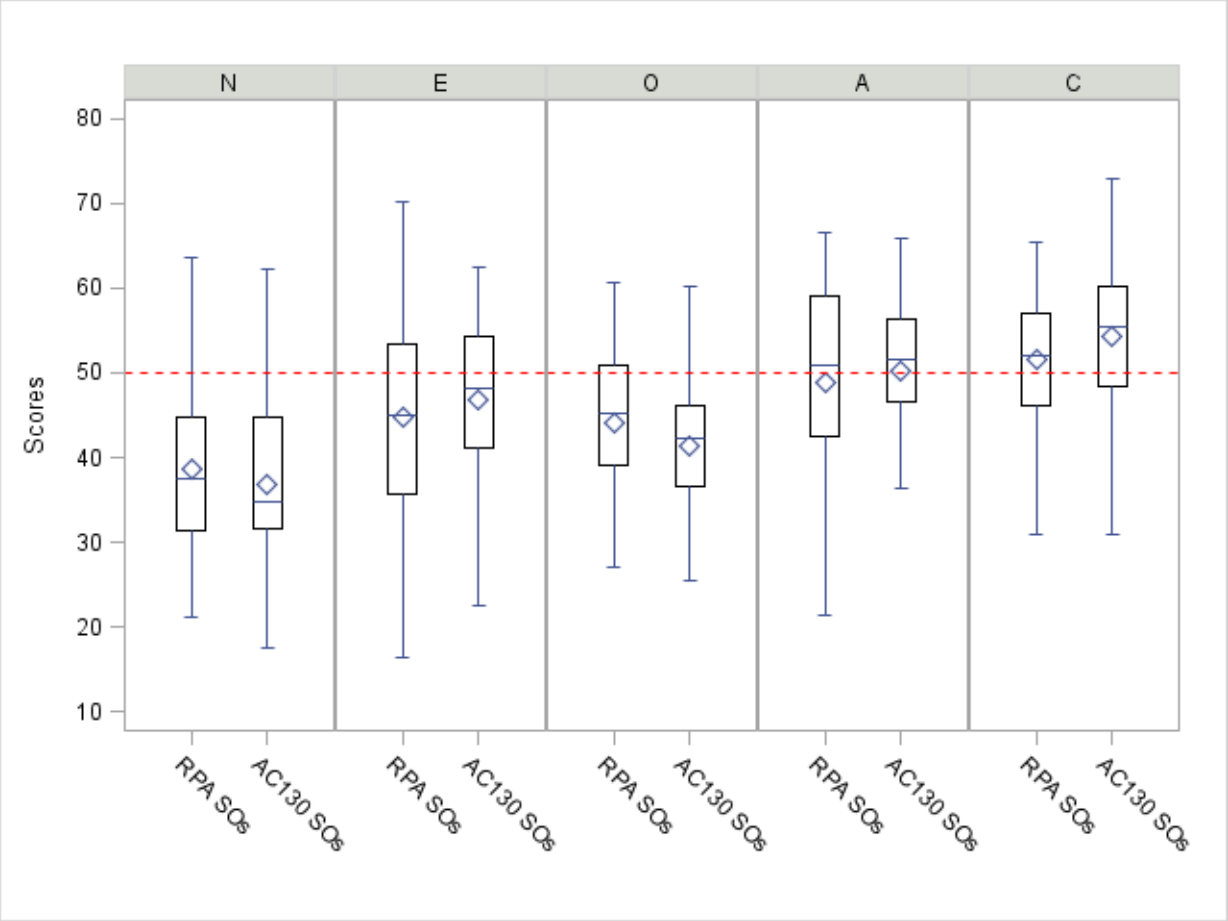

Figure 1. Box Plot Analyses of NEO PI-R Domain Scores for MQ-1 Predator (n=56) and AC-130 Gunship (n=59) SOs (◊ = mean, — = median, □ = ±1 SD; N=Neuroticism, E=Extraversion, O=Openness, A=Agreeableness, and C=Conscientiousness)

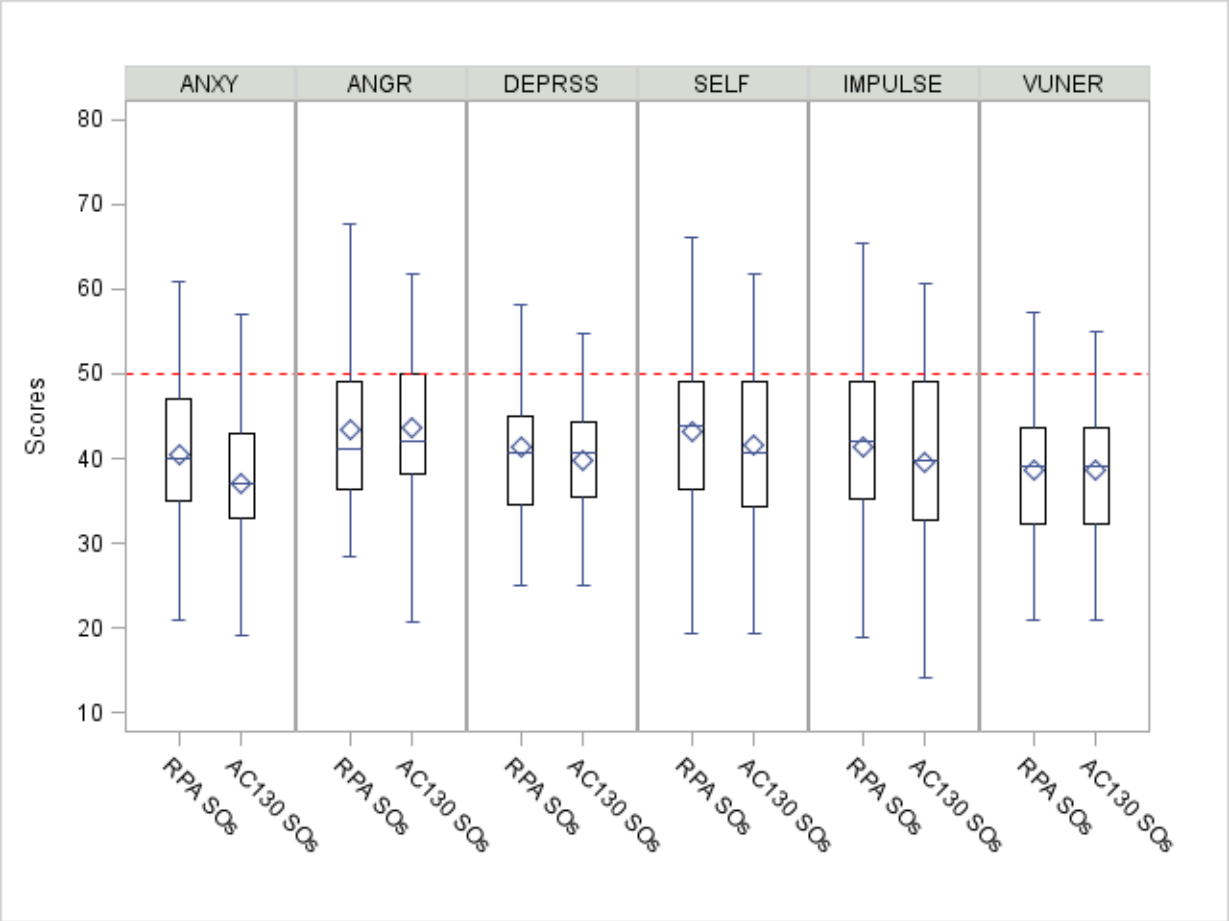

Figure 2. Box Plot Analyses of the Neuroticism Domain/Facet Subscale Scores for MQ-1 Predator (n=56) and AC-130 Gunship (n=59) SOs (◊ = mean, — = median, □ = ±1 SD; ANXY=Anxiety, ANGR=Anger, DEPRSS= Depression, SELF=Self-Conscientiousness, IMPULSE=Impulsivity, and VUNER=Vulnerability)

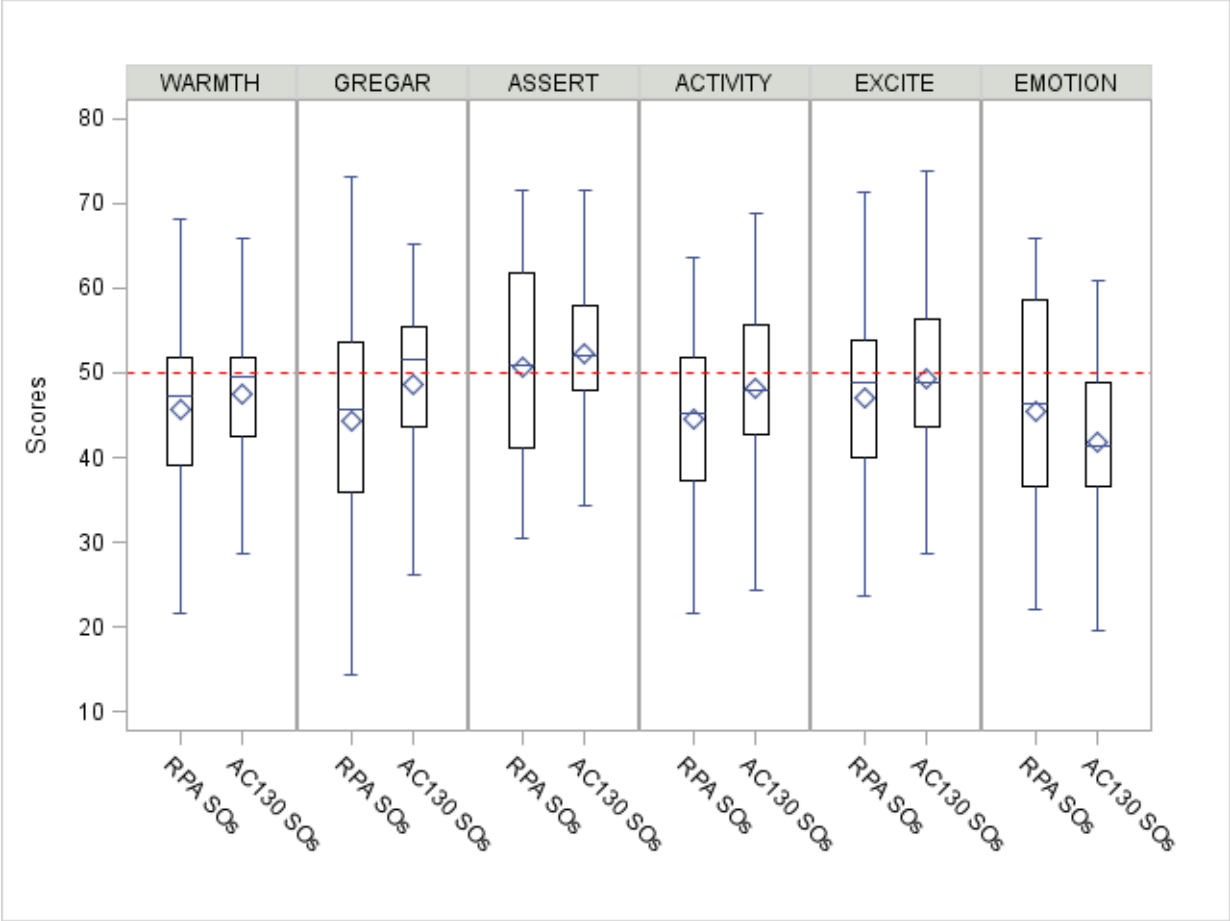

Figure 3. Box Plot Analyses of the Extraversion Domain/Facet Subscale Scores for MQ-1 Predator (n=56) and AC-130 Gunship (n=59) SOs (◊ = mean, – = median, □ = ±1 SD; WARMTH=Warmth, GREGAR= Gregariousness, ASSERT=Assertiveness, ACTIVITY= Action, EXCITE=Excitement-Seeking, and EMOTION=Positive Emotion)

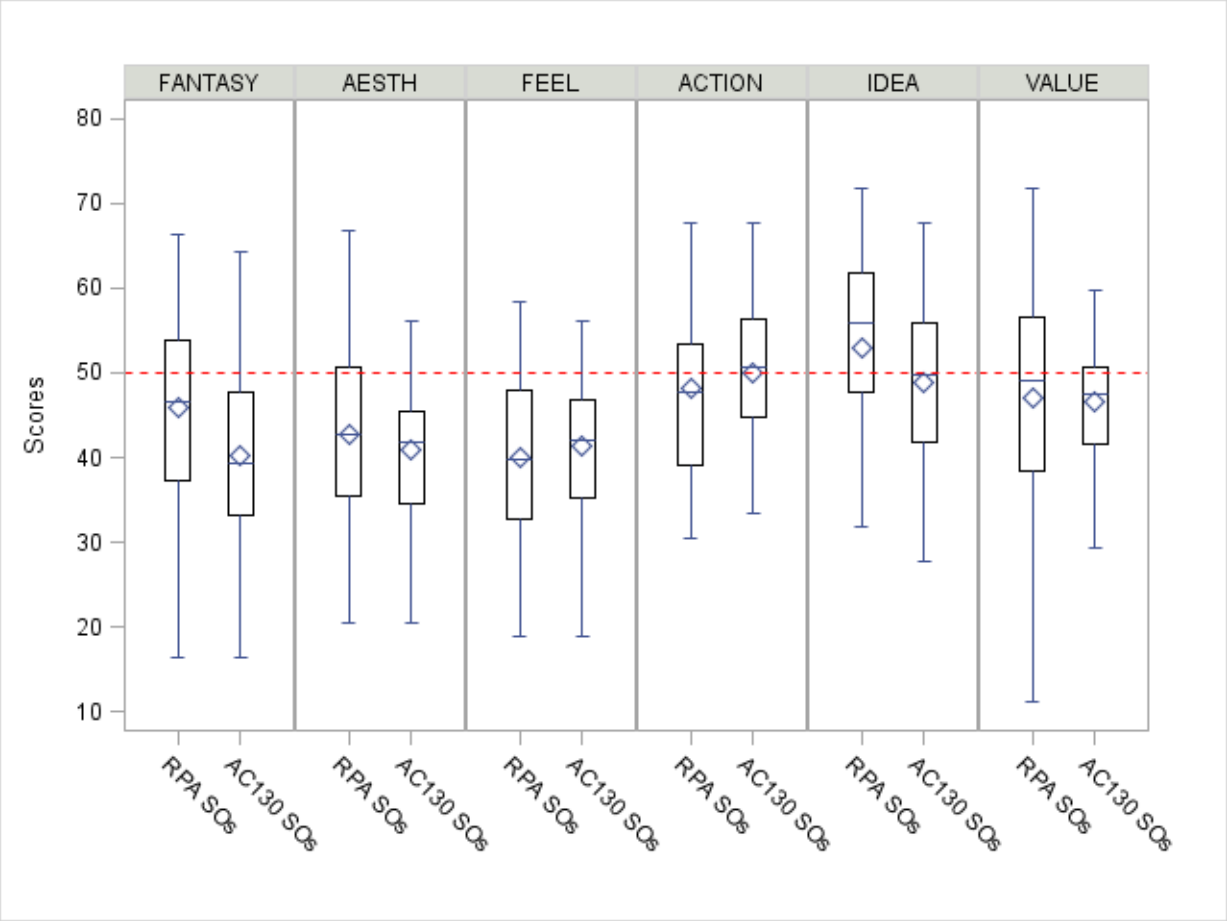

Figure 4. Box Plot Analyses of the Openness Domain/Facet Subscale Scores for MQ-1 Predator (n=56) and AC-130 Gunship (n=59) SOS (◊ = mean, — = median, □ = ±1 SD; FANTASY=Fantasy, AESTH=Aesthetics, FEEL=Feelings, ACTION=Actions, IDEA=Ideas, and VALUE=Values)

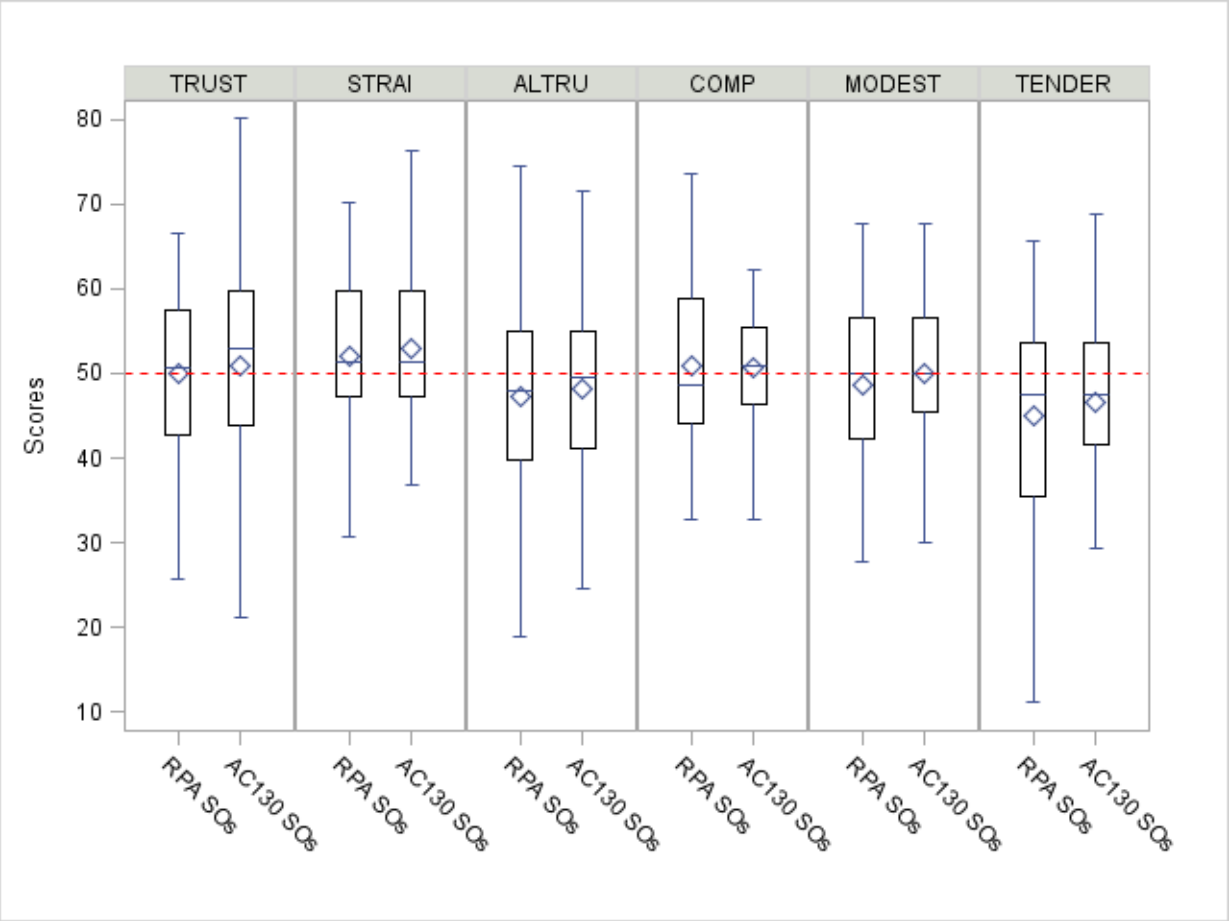

Figure 5. Box Plot Analyses of the Agreeableness Domain/Facet Subscale Scores for MQ-1 Predator (n=56) and AC-130 Gunship (n=59) SOs (◊ = mean, — = median, □ = ±1 SD; TRUST=Trusting, STRAI= Straightforwardness, ALTRU=Altruism, COMP=Compliance, MODEST= Modesty, and TENDER=Tendermindedness)

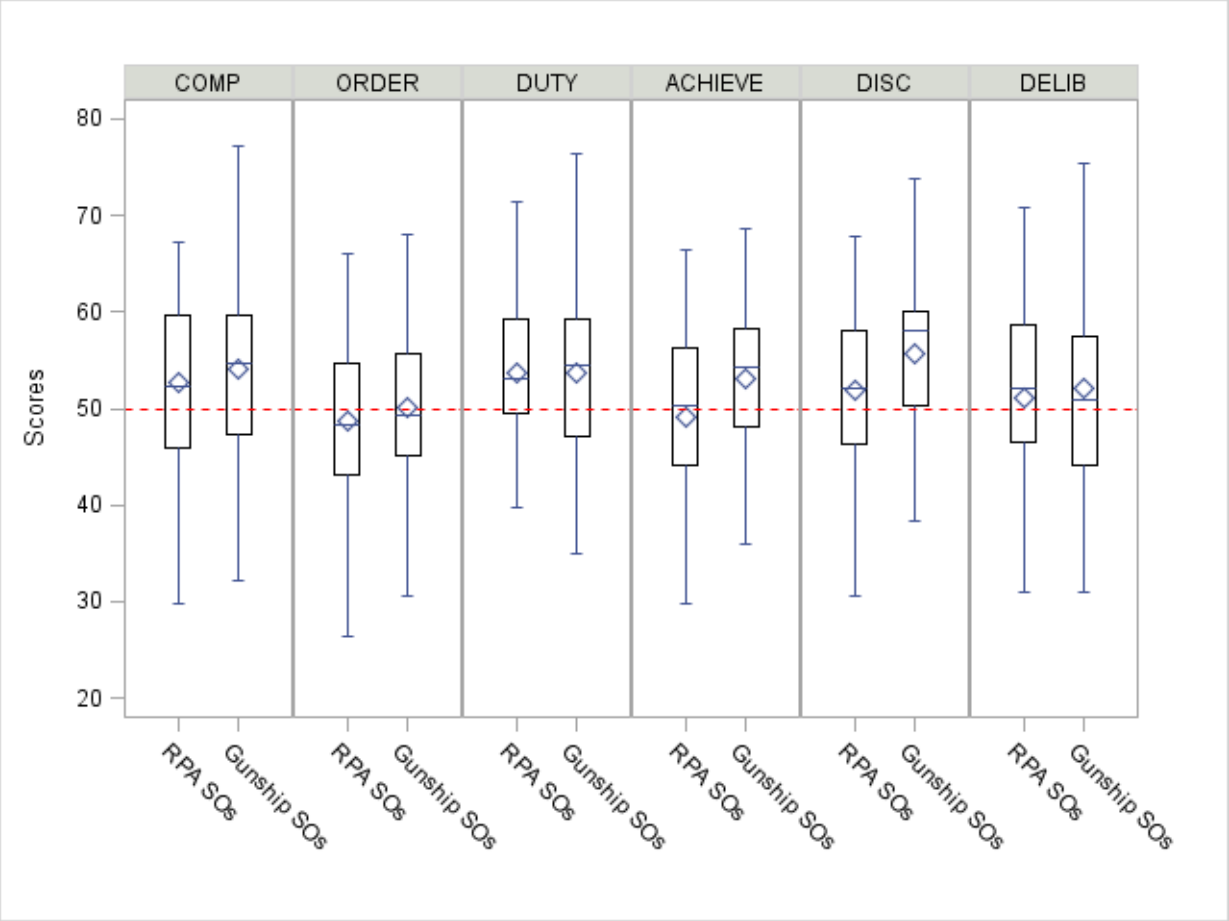

Figure 6. Box Plot Analyses of the Conscientiousness Domain/Facet Subscale Scores for MQ-1 Predator (n=56) and AC-130 Gunship (n=59) SOs (◊ = mean, — = median, □ = ±1 SD; COMP=Competence, ORDER=Orderliness, DUTY=Dutifulness, ACHIEVE=Achievement- Striving, DISC=Self-Discipline, and DELIB=Deliberation)

5.0 DISCUSSION

5.1 Predator/Reaper SOs vs. General Population

The first objective of this study was to obtain normative personality testing on MQ-1 Predator SO incumbents to assess how the personality traits of such a specialized group of enlisted airmen differ from the civilian general population.

The normative test scores from the NEO PI-R indicate that MQ-1 Predator SOs are interpersonally less agreeable than peers in the general population. They tend to be more cynical and skeptical and to assume that others may be dishonest or dangerous. They are also more likely to be craftier in their interactions with others, as well as more aggressive and competitive and

less likely to withdraw from conflict with others. They also tend to be more hardheaded and to make decisions based upon logic rather than emotional appeal. These individuals are less likely to maintain a high degree of control over their emotional disposition. They tend to be less interested in aspects related to performing arts and the aesthetic appeal of objects. They have a higher need for stimulation and sensation seeking and also tend to be more likely to motivate themselves to accomplish tasks. They often may perceive themselves as capable of handling highly difficult, demanding, and stressful situations. These observed differences revealed above provide insight into how the emotional and interpersonal disposition of Predator/Reaper SOs differs from their peers in the civilian normative sample. It also provides salient information into personality traits that can be predicted to be found in those candidates who adapt to the demands of both military life and the unique stressors found in the MQ-1 Predator operational environment.

As mentioned previously, the NEO PI-R is a well-developed personality measure that assesses traits considered critical to performance as reported by interviews with Predator/Reaper SMEs (Ref 19). It was reported earlier in a study of SMEs that higher than average levels of resilience to stress (or other negative emotional states), need for excitement-seeking, and compartmentalization of emotions are required to adapt to the operational demands. The results of this study support such perceptions held by SMEs within the RPA community.

Although Predator/Reaper SO scores reflected differences in other personality traits (e.g., less likely to report fear or sadness, higher levels of assertiveness, more open to ideas and creative thought, more likely to follow a behavioral routine), the magnitude of the difference was small (i.e., Cohen's *d* effect size .25 through .45) and did not meet the required cut value (i.e., Cohen's *d* effect size of .50) to be considered operationally relevant. However, it is possible that a large sample size would result in a greater effect size, thereby confirming the perception held by SMEs. In previous studies, SMEs have noted that SOs who displayed high levels of confidence and developed skills to compartmentalize their emotions also possessed a high level of conscientiousness, perseverance, and success-oriented characteristics that appeared to distinguish them from among those who showed difficulty in SO training and operational duties (Ref 19). However, caution is urged to not generalize the results of this study to nonweapon-deploying SOs (e.g., SOs from manned aircraft such as J-STARS or AWACS) or similar image analysts supporting intelligence operations, as these SOs may not have developed the needed skills in compartmentalizing their emotions that these duties often require. These duties may lack the rigors of training and operational demands seen in the MQ-9 Reaper/Predator SO fields, which thus may insulate them for taxing and stressful emotional tasks associated with their weapon-deploying SO brethren. This is consistent with results seen in the study of AC-130 gunship SOs that noted that persons who are overly self-conscious, lack self-confidence and/or decisiveness, and have a significant history of emotional difficulties and/or conflict are poorly suited for the occupational demands of RPA operations (Chappelle et al., *Critical Psychological Attributes of U.S. Air Force AC-130 Gunship Sensor Operators According to Subject Matter Experts*, Technical Report AFRL-SA-BR-TR-2009-0015, Feb 2009; available through the Defense Technical Information Center to DoD and DoD contractors only).

5.2 MQ-1 Predator SOs vs. AC-130 Gunship SOs

The second objective of this study was to assess how key personality traits (e.g, neuroticism, extraversion, openness, agreeableness, conscientiousness) for MQ-1 Predator SOs differ from SOs with similar duties but supporting a manned aircraft (i.e., AC-130 gunship).

As mentioned previously, it was perceived by many line operators that Predator/Reaper SOs were less resilient due to the remote nature of their operations. They perceived AC-130 gunship SOs to be more resilient, more competitive, more conscientious, and more excitement-seeking due to the notion that they must perform their duties in a combat zone in highly demanding situations with high risks to personal safety. Indeed, specific portions of the USAF aircrew training program revolve around survival, evasion, escape, and resistance techniques, which these aircrew receive to specifically prepare them if they are shot down and/or captured in the performance of their combat duties. However, upon further review, others do not perceive such differences in the two SO groups. Instead, it can be proposed that Predator/Reaper SOs share many of the same traits as their AC-130 SO peers given the commonality of much of their training. Many areas do indeed have a significant amount of overlap in their training and/or duties. Imagery analyses, ISR, and weapon-deploying support roles are often similarly employed in theater, regardless of the unmanned nature of their operations. Indeed, it is also notable that the results of this study did not find any significant differences in scores on the domain or facet subscales as measured via the NEO PI-R between Predator/Reaper and AC-130 gunship SOs based upon the conservative statistical cut-off criteria established prior to analysis. Thus, the results of this study may indicate that the personality traits of Predator/Reaper SOs, as a group, are more like AC-130 gunship SOs than like their peers in the civilian general population.

Similar to the comparison with the civilian population, Predator/Reaper SO scores reflected differences in other personality traits (e.g., less likely to report fear, higher levels of assertiveness, more likely to express positive emotion, more likely to be achievement-striving and self-disciplined), but the magnitude of the difference was small (i.e., Cohen's *d* effect size .25 through .45) and did not meet the required cut-off value (i.e., Cohen's *d* effect size of .50) for operational relevance. Because the magnitude of the difference was very small, it is unlikely that such personality traits represent clear differences between groups.

Given that the number of selectees screened each year is relatively large and likely to grow given the increasing demand for Predator/Reaper operations, the use of the NEO PI-R for new recruits (direct accessions or cross-training applicants) or similar personality measures may allow for a more focused evaluation of traits and greater granularity in determining how an enlisted airman within the SO selection pool varies on traits considered critical to performance (Ref 1). Thus, it is especially important to select the candidate with a given set of personality traits likely to contribute to successful performance given that (a) the economic costs are high; (b) the nonstandard, unconventional duty demands of the position are psychologically demanding; and (c) Predator/Reaper operations are carried out in an environment where the threat to human safety, issues of national security, foreign relations, and mission failure can be substantial and far reaching.

5.3 Aeromedical Application and Clinical Vignette

The third objective of this study was to develop occupationally specific normative data and distribution of personality scores for use in clinical psychological aeromedical evaluations for Predator/Reaper SOs for use in aeromedical evaluations.

Through the use of normative data, it is possible to examine the degree of specific traits on particular scales as compared with a specific group. On the other hand, pattern analysis of an individual's scores on several personality traits (domain and facet scales) creates an overall profile that provides an indication of how strengths and weaknesses related to adapting to a given setting or situations. For example, if a Predator/Reaper SO applicant's scores on personality testing reveal (when compared with successful airmen in that platform) someone who is significantly vulnerable to stress (or other negative emotional states) and highly avoidant of high risk activities with significant difficulty compartmentalizing his or her emotions, then there would be reason to suspect the person's emotional-interpersonal disposition may be incompatible with the inherent risks and dangers associated with Predator/Reaper SO duties in accordance with AFI and aeromedical policy (Ref 16). On the other hand, if an SO has been disqualified from participating in Predator/Reaper operations due to a history of anxiety, but his or her scores now reflect a high level of emotional and interpersonal functioning and are within normal limits when compared with other Predator/Reaper SOs, then there may be reason to conclude he or she could return to his or her flying duties.

The results of Table 2 and the description of personality descriptors of Predator/Reaper SOs above are based upon averages, and individual characteristics can vary widely. As a result, it is important to utilize the percentile tables in Table 1 of this study when clinically evaluating and interpreting the scores of a Predator/Reaper SO (or training candidate). The percentile table allows a psychologist to determine how specific scores compare with the distribution of scores for rated Predator/Reaper SOs who successfully passed training as a group. In general, scores that fall above the 90^{th} or below the 10^{th} percentile can be viewed as outliers and significantly different from most Predator/Reaper SOs.

The utility of these data is illustrated by the case of a male Predator SO with a history of an adjustment disorder with prominent anxiety in response to several clustering life stressors. His history of an adjustment disorder disqualifies him from Predator duties according to USAF aeromedical policy (Ref 16). In this case, he needed an evaluation to determine if his emotional and interpersonal disposition had returned to baseline, his adjustment disorder was fully resolved, and he fully met the aeromedical waiver criteria for returning to his operational duties. The psychologist who evaluated him included psychological testing (e.g., NEO-PI-R) in the evaluation. It was particularly important for the psychologist to determine if his emotional and interpersonal disposition was compatible with managing the rigorous nature of his duties as a Predator/Reaper SO providing direct ISR and weapon-deploying support to operations in theater.

Based upon the SO's responses to items on the domain and facet scales of the NEO PI-R, the psychologist discovered his scores (when compared with peers in the civilian, non-pilot normative sample) were within normal limits. However, the distribution table in this study reveals that his scores for specific traits (deemed critical to performance by SMEs) are well outside normal limits for Predator/Reaper SOs as a group. According to the data from Table 1, when compared with other Predator/Reaper SOs, his vulnerability to stress (score = 50) and anxiety (score = 51), depression (score = 53), as well as general level of self-conscientiousness (score = 53) are at or above the 90^{th} percentile. Furthermore, his scores regarding propensity to

engage in high risk activities (score = 34), sense of orderliness (score = 45), and self-confidence (score = 39) are well below the 10th percentile. His scores suggest his emotional and interpersonal disposition and motivation are lower than expected and his vulnerability to anxiety and other stress-related difficulties is higher than expected and outside the normal limits of Predator/Reaper SOs.

Equally as important to comparing his scores to occupationally specific normative data was comparing his scores to baseline information obtained from discussion with supervisors in his chain-of-command and his spouse. After reviewing collateral information from others in addition to his current test scores, the psychologist concluded the Predator SO training applicant's risk of recurrence was higher than expected in the face of the high-risk, challenging, and dangerous conditions associated with Predator/Reaper duties, especially weapon-deploying support in current combat zones. As a result, his psychological disposition did not appear to meet the aeromedical criterion for ground-based controller duties, and it was believed he could benefit from additional mental health care. The normative data included in Table 1 helped the psychologist to render a difficult and very important decision about the SO's readiness to return to his Predator duties, where the consequences of mission failure are high.

It is clear that population-specific normative data are helpful for evaluating Predator/Reaper SOs when rendering aeromedical decisions about their psychological disposition and suitability for participating in high-risk, aviation-related operations. This is especially the case when assessing how the psychological disposition of an applicant compares with other Predator/Reaper SOs who successfully passed training. There are significant group personality differences between the Predator/Reaper SO normative scores and those utilized in the NEO PI-R civilian, combined general population normative sample. As a result, psychologists should be sensitive to such differences and utilize normative data that match the purpose of the evaluation and represent the group with which an applicant or incumbent is being compared. Otherwise, a psychologist may mistakenly conclude that a given set of personality scores is within normal limits when, in fact, the scores are not when compared with occupationally specific norms for a high-risk, high-demand career field. As mentioned earlier by Chappelle et al. (Ref 19), normative data are key to the clinical interpretation of psychological test scores that are a part of the evaluation process for selecting applicants for high-demand, high- operational military career fields and for considering a person's readiness for returning to such a career field after being disqualified for psychological reasons.

5.4 Limitations of the Study

Although this study used reliable and valid measures of personality, there are limitations. First, generalizing the results of this study to other USAF SOs in other airframes (e.g., JSTARS and AWACS) is likely not to be appropriate. The selection process, type of military flying, and aviation-related missions differ. Second, the significant differences between USAF Predator/Reaper SOs and the civilian NEO PI-R normative sample may be, in large part, due to age and educational differences. Third, as mentioned previously, caution should be given to the personality descriptors of Predator/Reaper SOs above because they are based upon averages; individual characteristics can vary widely. Fourth, aeromedical evaluations that involve the assessment of Predator/Reaper SO training applicants (as well as incumbents) and those being considered for return to their high-risk, high-demand operational duties should include collateral sources of information from others (e.g., spouse, military commander, supervisors) and clinical

interviews to fully understand the reliability and validity of specific test scores. Fifth, the civilian, non-pilot normative group for the NEO PI-R is based upon U.S. census data projected for 1995 and is likely not representative of the current general population revealed by more recent U.S. census data. As a result, the need for a modern and population-specific comparison group (to not rely exclusively on the normative group from over 15 yr ago) when interpreting USAF Predator/Reaper SO (and training applicant) scores on the NEO PI-R is becoming increasingly important. And, lastly, the absence of validity scales within the NEO PI-R makes it difficult to assess the degree of impression management that participants of this study engage in while completing the test. Similar to the limitations in a study of personality traits of U.S. pilots (Ref 19), it is possible that participants consciously responded to items in a way that would create the impression of having the "right stuff." An alternative personal test measuring similar traits with well-developed validity scales may help to reveal the degree of impression management influencing test results.

It is also important to note that although the results of this study suggest that Predator/Reaper SOs are more like AC-130 gunship SOs as a group, the results do not suggest that those who successfully pass Predator/Reaper training will also successfully adapt to AC-130 gunship training. Rather, the results of this study suggest that certain personality traits may influence performance. The study does not suggest that such traits are sufficient for successfully adapting to the Predator/Reaper operational environment. There are other variables that likely account for performance outcomes and that distinguish those who voluntarily enter AC-130 gunship versus Predator/Reaper operations. For instance, SMEs also reported motivation and inherent interest in the job duties specific to a manned or remotely piloted aircraft platform as critical factors for successful SO performance (see Chappelle et al., p. 16; Ref 19).

6.0 CONCLUSION

A valid psychological assessment is a crucial part of the process of providing psychological services to military personnel in unique and high-risk aircrew positions such as AC-130 gunship SOs and Predator/Reaper SOs. In addition to ability and motivational factors, personality characteristics play a key role in the success of SOs in these two unique aviation career fields. Normative data when compared to SME reports suggest that the successful SO is extroverted, assertive, highly competitive, achievement oriented, and tough minded. This can be expected to hold true across both the AC-130 gunship SO and Predator RPA SO career fields. While limited data are available due to the small number of female SOs currently operational, one can also predict that female SOs also possess similar personality characteristics. Female SOs may be found to be slightly more open to new ideas or experiences as their personality testing demonstrates; however, that is likely congruent with their choice of military aviation as a career field, which, despite much progress in current American society, is still a controversial and nontraditional role for women in the general population as well as within the U.S. military. In such cases, NEO PI-R data can be particularly useful for comparing aircrew applicants to members of the general population for specific male/female norms and obtaining data that can assist in the accurate diagnosis (or nondiagnosis) of psychological issues in both the applicant and current aviator and the selection of possible interventions by both flight surgeons and military aviation psychologists.

The identification of key psychological attributes of AC-130 gunship SOs and Predator RPA SOs is essential to identifying aircrew who are suitable for the unique nature of these

operations and who are able to adapt and thrive in this unique and growing critical career field. The results of this study provide psychologists with valuable clinical information that identifies traits that differentiate AC-130 gunship SOs and Predator SOs across several personality domains and facets when compared to the general population who have undergone similar testing. The test scores from the NEO-PI-R given to the above populations in this study do indicate that, as a composite group, successful airmen in the Predator/AC-130 gunship SO career fields do appear to have different and unique personality traits than those in the general civilian population. Specifically, in five of the domain facets within the NEO PI-R personality constructs, significant differences in Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness were noted. In addition, it appears that airmen who have been successful in training as well as their line operational duties in the USAF were more likely to be assertive; less vulnerable to emotional distress (such as anxiety and depression); and less open to imagination, aesthetics (i.e., expressive arts), and inner feelings than seen in other less successful candidates. These members were much more successful than their peers in completing tasks, less skeptical of others and their intentions, and less trusting while also being more conscientious and willing to pursue self-interests, disciplined, orderly, deliberate, and achievement striving with a strong sense of duty as demonstrated by further detailed examination of their facet and domain scores obtained within the NEO PI-R. In studies and commentary by SMEs within the RPA community, those who failed SO training or were thought to be less successful/high-performing aircrew often lacked these characteristics when their NEO PI-R scores were examined. Thus, these isolated scores when fully taken into consideration lend significant support to the involvement of military clinical flight surgeons and psychologists in the selection of RPA applicants as well as in opinions regarding these vital aircrew's suitability for continued RPA SO duties and sustainment of the career field (Ref 19).

These results of our study show not only unique traits and facets needed for success in these two career fields as compared to the general population but also where they share similarities. It is likely that these similar duties have similar overlap in key attributes. AC-130 gunship SO responsibilities and capabilities overlap those of Predator RPA SOs in many areas. Both share similar full motion video surveillance capability, provide vital ground troop support and reconnaissance, and involve precision aerial strike capability in their current operational capacity/use. The only primary difference is that AC-130 gunship SOs must also deal with the additional concerns of aerial flight and the physiological and physical issues that also accompany it (i.e., motion sickness, hostile fire, etc.). However, the unique similarities of these two career fields may be of particular importance to Air Force decision makers in the shaping and implementation of policies affecting the AC-130 gunship and Predator RPA SO career fields. It cannot be ignored that choices regarding minimizing the acquisition, selection, manning, and retention costs of these operations while also maximizing their efficiencies will continue to be important as USAF leadership seeks to expand these career fields. This can be expected to be of continued importance as the numbers, role, and prominence of these duties evolve in future operations.

Additionally, similarities in normative personality data between these two groups may prove to be very useful to those tasked with the development of aeromedical policy and fitness for duty decisions affecting aircrew in these career fields. The results of this study additionally show that normative data obtained can be valuable to military health professionals (i.e., flight surgeons and psychologists) tasked with the day-to-day care of these aircrew. Properly used and interpreted, these data can assist with making informed aeromedical decisions and

recommendations with regard to the clinical care and fitness for duty of aircrew tasked with supporting these vital missions.

7.0 REFERENCES

1. Chappelle W, McDonald K., King RE, *Psychological Attributes Critical to the Performance of MQ-1 Predator and MQ-9 Reaper U.S. Air Force Sensor Operators*, Technical Report AFRL-SA-BR-TR-2010-0007, USAF School of Aerospace Medicine, Brooks City-Base, TX, Jun 2010.

2. Schmidt FL, Hunter JE, "The Validity and Utility of Selection Methods in Personnel Psychology: Practical and Theoretical Implications of 85 Years of Research Findings," *Psychological Bulletin*, **124**(2), 1998, pp. 262-74.

3. Schmidt FL, Hunter J, "General Mental Ability in the World of Work: Occupational Attainment and Job Performance," *Journal of Personality and Social Psychology*, **86**(1), Jan 2004, pp. 162-73.

4. Ree MJ, Earles JA, *Differential Validity of a Differential Aptitude Test*, AFHRL-TR-89-59, Air Force Human Resources Laboratory, Manpower and Personnel Division, Brooks AFB, TX, May 1990.

5. Ree MJ, Earles JA, "Predicting Training Success: Not Much More than g," *Personnel Psychology*, **44**(2), Jun 1991, pp. 321-32.

6. Ree MJ, Earles JA, "Intelligence Is the Best Predictor of Job Performance," *Current Directions in Psychological Science*, **1**(3), Jun 1992, pp. 86-9.

7. Ree MJ, Earles JA, Teachout MS, "Predicting Job Performance: Not Much More than g," *Journal of Applied Psychology*, **79**(4), 1994, 518-24.

8. Barrick MR, Mount MK, Judge TA, "Personality and Performance at the Beginning of the New Millennium: What Do We Know and Where Do We Go Next?" *Personality and Performance*, **9**(1/2), Mar/Jun 2001, pp. 9-30.

9. Barrick MR, "Yes, Personality Matters: Moving on to More Important Matters," *Human Performance*, **18**(4), 2005, pp. 359-72.

10. Burch GSJ, Anderson N, "Personality as a Predictor of Work-Related Behavior and Performance: Recent Advances and Directions for Future Research," in Hodgkinson GP, Ford JK, eds., **International Review of Industrial and Organizational Psychology, Volume 23**, John Wiley & Sons, Ltd, Chichester, UK, 2008, pp. 261-305.

11. Le H, Oh I, Robbins SB, Ilies R, Holland E, Westrick P, "Too Much of a Good Thing: Curvilinear Relationships Between Personality Traits and Job Performance," *Journal of Applied Psychology*, **96**(1), Jan 2011, pp. 113-33.

12. Tett RP, Christiansen ND, "Personality Tests at the Crossroads: A Response to Morgeson, Campion, Dipboye, Hollenbeck, Murphy, and Schmitt (2007)," *Personnel Psychology*, **60**(4), 2007, pp. 967-93.

13. Day DV, Silverman SB, "Personality and Job Performance: Evidence of Incremental Validity," *Personnel Psychology*, **42**(1), Mar 1989, pp. 25-36.

14. Picano JJ, Williams TJ, Roland RR, "Assessment and Selection of High-Risk Operational Personnel," in Kennedy CH, Zillmer EA, eds., **Military Psychology: Clinical and Operational Applications**, Guildford Press, New York, Aug 2006, ch. 17, pp. 353-70.

15. Stulberg AN, "Manning the Unmanned Revolution in the U.S. Air Force," *Orbis*, **51**(2), Spring 2007, pp. 251-65.

16. U.S. Air Force, *Medical Examinations and Standards*, Air Force Instruction 48-123, Department of the Air Force, Washington, DC, 24 Sep 2009, URL: http://www.e-publishing.af.mil/shared/ media/epubs/AFI48-123.pdf. Accessed 28 Mar 2010.

17. Costa PT, McCrae RR, **Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI) Professional Manual**, Psychological Assessment Resources, Odessa, FL, 1992.

18. Cohen J, **Statistical Power Analysis for the Behavioral Sciences**, 2nd ed., Lawrence Erlbaum Associates, Inc., Publishers, Hillsdale, NJ, 1988.

19. Chappelle WL, Novy PL, Sowin TW, Thompson WT, "NEO PI-R Normative Personality Data That Distinguish U.S. Air Force Female Pilots," *Military Psychology*, **22**(2), 2010, pp. 158-75.

LIST OF ACRONYMS

AFI	Air Force instruction
AOB	air order of battle
ATO	air tasking orders
DoD	Department of Defense
ISR	intelligence, surveillance, reconnaissance
NEO PI-R	NEO Personality Inventory-Revised
RPA	remotely piloted aircraft
SD	standard deviation
SME	subject matter expert
SO	sensor operator
USAF	U.S. Air Force